Prenatal health care beyond the obstetrics service: Utilization and predictors of unscheduled care

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Abstract

OBJECTIVE—The objective of the study was to describe the patient characteristics of prenatal care utilization within and outside of routine obstetric care, and the clinical and psychosocial factors that predict care utilization.

STUDY DESIGN—Four hundred twenty pregnant women enrolled in a randomized controlled trial receiving prenatal care in a university-affiliated clinic. All hospital encounters were obtained by review of computerized databases. The Kotelchuck index (KI) was computed, and the characteristics of inadequate, adequate, or excessive prenatal care were described. Demographic and psychosocial predictors of unscheduled visits were evaluated.

RESULTS—A total of 50.5% of women were adequate users by KI, with 19% being inadequate. An average of 5 additional unscheduled encounters occurred (standard deviation 4.2; range, 0−26). Almost 75% of participants made an unscheduled obstetric visit, with 38% making 2 or more unscheduled visits. Overweight/obese, younger women, high symptom distress, and excessive and inadequate prenatal users were more likely to utilize the labor floor before delivery.

CONCLUSION—Unscheduled care is common during pregnancy.

Keywords

health care utilization; prenatal care

Prenatal care utilization has been used as a health care indicator, with guidelines for the content and timing of prenatal care provided by the American College of Obstetricians and Gynecologists.[1-3] Because of difficulties evaluating adherence with care guidelines and content of care, the adequacy of prenatal care has been quantified by various indices emphasizing the number and timing of obstetric visits.[4-6] The most commonly used of these, the Kotelchuck index (KI), has become a mainstay of evaluation of prenatal care and has been correlated with obstetric outcomes such as low birthweight and fetal demise.[7] Although obstetric visits alone have been used to assess the adequacy of prenatal care, prenatal patients receive care in a variety of settings. During pregnancy, patients may also seek unscheduled care in the emergency department (ED) or labor and delivery (LD); however, there is limited

information about the characteristics of unscheduled care, particularly among patients who already have established care providers.

In the general ED population, frequent utilization is associated with poverty, poor access to primary health services, substance abuse, and psychiatric conditions, as well as higher rates of chronic illness and mortality.[8-10] These frequent ED users ("frequent flyers") have also been shown to utilize a wide range of services, including primary care clinics, and have lower levels of perceived social support and more psychiatric symptoms.[11] Examination of obstetric care utilization has been limited to certain populations addressing access to care and specialized referral services such as genetic counseling.[12] There are limited data in the obstetric literature on the clinical and psychosocial characteristics that predict adequacy of prenatal care and utilization patterns by patients outside the obstetrics clinic. This is important because excess utilization may result in provision of unnecessary diagnostic and treatment services and consequent excess cost. It also may play a significant contribution to inadequate staffing in high-risk areas, such as the ED and labor floor, which has been demonstrated to contribute to medical errors as well as cost.[13-15]

The aims of this study were: (1) to describe the patterns of care utilization in publicly insured patients registered for obstetric care in a university hospital clinic and identify factors that differentiate adequate users from inadequate or excessive users of prenatal care using the KI; and (2) to document other health service utilization to determine the patient characteristics and psychosocial factors predictive of overutilization of health care services.

Materials and Methods

Study participants

Data from this study came from 503 pregnant women enrolled in a randomized controlled trial aimed at promoting improved general health and reproductive behaviors through group prenatal care. This was a prospective study following up participants from early pregnancy through 1 year postpartum. Participants were recruited from 2 university-affiliated obstetrics clinics in New Haven, CT, and Atlanta, GA. Inclusion criteria were: (1) pregnancy at less than 24 weeks' gestation; (2) age younger than 25 years; (3) no severe medical problems necessitating individualized case management as a high-risk pregnancy; (4) language use of English or Spanish; and (5) willingness to participate in a randomized clinical trial.

All patients underwent written informed consent, and the study was approved by the Yale University Human Investigations Committee. All patients had public (eg, Medicaid) or hospital assistance for complete prenatal care insurance coverage. Of 1542 eligible women, 1047 enrolled in the study (68% participation rate). The population studied was limited to 1 site (Yale University) because of the ability to obtain institution-wide electronic medical and cost data on alternative sites of care other than the obstetric clinic.

Procedures

Structured interviews occurred after enrollment in the second trimester at an average gestational age of 18 weeks (time 1) and in the third trimester at an average gestational age of 34 weeks (time 2) via audio computer-assisted self-interview. Participants were paid $25 for each interview.

All encounters at the facility were recorded electronically in a computerized database utilized for billing purposes, which identifies sites of care, inpatient vs outpatient status, International Classification of Codes (ICD)-9 codes, and cost of care. Cost data included charges revenue and actual costs, but only actual costs were utilized because they are not dependent on

reimbursement rates. Only outpatient visits were analyzed. The encounters were confirmed by review of the electronic medical record used in the outpatient clinics.

Utilization was tabulated as number of separate visits (ie, occurred on separate date) for each of the following categories: prenatal care, unscheduled obstetrics and gynecology visit (ie, visit to obstetrics-gynecology clinic that was not a scheduled prenatal care visit), LD visit that did not result in an admission, maternal-fetal medicine (MFM) visit not including the initial routine ultrasound, ancillary visit (eg, social worker, nutritionist), and ED and primary care/ internal medicine visit. The MFM visits included both follow-up ultrasounds and antenatal testing, as well as unscheduled visits addressing complications of pregnancy. An unscheduled visit included any urgent visit, regardless of whether the patient called and was instructed to come in for evaluation.

We calculated the KI on the basis of the gestational age at the initiation of care and the gestational age of delivery. From the duration of eligible care, the expected number of prenatal visits was derived, according to American College of Obstetricians and Gynecologists guidelines. The KI index was calculated by dividing the number of observed prenatal clinic visits by the number of expected visits and multiplying by 100 and was designated as inadequate (< 50% of expected), intermediate (50−79% expected), adequate (80−109%), and adequate plus (> 110%).[5] We created the category of excessive use (140− 300%) to capture excessive utilization of prenatal care.

Demographic and medical history measures

Patient demographics were obtained by questionnaires that assessed age, race, parity, and body mass index (BMI) before pregnancy. Participants were categorized into age groups (14−19 yrs old vs 20−25 yrs old), racial groups (African American vs white, Latina, and other races), parity groups (0 vs 1 vs 2 or more), and BMI groups (underweight/normal, BMI 0−24 vs overweight/ obese, BMI 25− 40). Substance use during pregnancy was assessed by asking participants whether they had drank, smoked cigarettes, or used marijuana or cocaine since becoming pregnant. Income was assessed by using median income level of their census tract. Furthermore, medical record reviews obtained medical risk information, including hypertension, diabetes, preeclampsia, multiple gestations, and fetal abnormalities.

Psychosocial measures

For all psychosocial measures, unless noted, 2 groups were created based on a median split that represented low and high groups on each construct (eg, low social support and high social support).

Depression was assessed in the second and third trimesters (time 1 and 2) by the 15 cognitive affective items of the Center for Epidemiological Studies-Depression (CES-D).[16] Respondents rated the frequency that they had experienced various depressive symptoms over the previous week on a 0−3 scale. To address the possible overinflation of the scale by the somatic complaints of pregnancy, only the cognitive affective subcomponent was used.[17] The Cronbach α for the measures were 0.85 and 0.90 and time 1 and 2, respectively. Two groups were created based on the a priori clinical cut-off for depressive symptoms (16 or greater).

Social support was assessed with a 7-item subscale of the Social Relationship Scale that evaluated the perceived availability of emotional and material support (eg, talk about an interpersonal problem, borrow money in a medical emergency).[18] The Cronbach α for the measures were 0.91 and 0.89 at time 1 and 2, respectively.

Social conflict was assessed with a 7-item social conflict subscale of the Social Relationship Scale, which evaluated the perceived degree of social conflict in an individual's everyday social network.[18] The Cronbach α for the measures were 0.82 and 0.86 at time 1 and 2, respectively.

Self-esteem was assessed by a 10-item self-reported self-esteem scale.[19] The Cronbach α for the measures were 0.85 and 0.87 at time 1 and 2, respectively.

Prenatal distress was assessed by a 17-item scale developed by Lobel et al.[20] Participants were asked to rate how much they were "bothered, worried, or upset" about various aspects of pregnancy (eg, low energy, changes in weight, taking care of the newborn baby). The Cronbach α for the measures were 0.86 and 0.88 at time 1 and 2, respectively.

Pregnancy symptom discomfort was assessed in the third trimester by a 14-item scale developed by the research group that asked how bothered women were about common physical comforts experienced during pregnancy (eg, vomiting, heartburn, frequent urination, fatigue, low back pain). The Cronbach α for the measure was 0.80.

Prenatal care satisfaction was assessed in the third trimester by a 25-item adaptation of Littlefield and Adams' Patient Participation and Satisfaction Questionnaire.[21] The Cronbach α for the measure was 0.96.

Prenatal care knowledge was assessed in the third trimester by a 15-item scale measure developed by the research group evaluating prenatal care knowledge on several main content areas: nutrition, substance use, labor, baby care, and breastfeeding. The Cronbach α for the measure was 0.68.

Readiness to care for the baby was assessed by a single item that asked participants to estimate on a scale of 0−100 how ready they were to take care of a baby.

Data analysis

To assess aim 1, frequencies and means were conducted to describe adequacy of prenatal care. Next, a multinomial regression was performed with 3 groups derived from the KI for the dependent variable: inadequate care (a combination of inadequate and intermediate), adequate care, and excessive care (a combination of adequate plus and excessive). Adequate care served as the comparison group. All independent variables were assessed on the outcome in bivariate analyses. All predictors significant at $P < .20$ were included in the multivariate analyses.

To assess aim 2, frequencies and means of total number of additional visits and whether individuals made unscheduled al. visits to obstetrics and gynecology, LD, MFM, primary care/internal medicine, and the ED and ancillary services. Next, an analysis of variance was conducted to assess differences between adequacy of prenatal care groups on the total number of additional visits.

Multiple regression was conducted to determine medical and psychosocial predictors of total number of unscheduled visits. A series of logistic regressions were conducted to assess predictors of an unscheduled visit at the 4 most frequent care categories (eg, additional obstetrics and gynecology visits, LD, ED, MFM). All independent variables were assessed on outcomes in bivariate analyses. All predictors significant at $P < .20$ for any of the care categories were included in multivariate analyses. All analyses controlled for experimental group membership by including group membership as a covariate in multivariate analyses.

Results

The sample consisted of 503 participants; 67 were excluded from analyses because they had medical conditions during pregnancy that could require additional medical visits: hypertension, diabetes, preeclampsia, multiple gestation, and fetal abnormalities. In addition, 16 participants did not complete time 2 assessments. This resulted in a final sample of 420 patients for these analyses. The 420 patients did not differ from the 83 participants not included in these analyses on any of the primary study variables. Approximately 59% of participants were African American, 27% were Latina, and 14% were white or some other race, which is representative of the population distribution using the clinic. The mean age of participants was 20.7 years (standard deviation [SD] 2.6) with 46% aged 14−19 years old. Sixty-five percent of participants were nulliparous and 23% had a parity of 1.

Participants attended an average of 11.4 standard prenatal visits during their pregnancy (SD 3.7; range, 0−26), with only 3 participants (0.6%) having 0 visits. The correlation between the electronic medical records and the hospital database was high (r = 0.83; $P < .001$), demonstrating validity of the cost database. The results showed an average on the KI of 101.8% (SD 30.5; range, 0−266.7%). The prenatal care utilization categories are shown in Table 1.

Cost implications

We compared the overall actual hospital costs during prenatal care and delivery among the 3 groups. Results showed a significant difference in antenatal costs (F = 16.59; $P < .001$), with the excessive group having significantly more antenatal costs (M = $5439), compared with the inadequate and adequate groups (both M = $3655). However, there was no difference among the 3 groups with regard to delivery costs (F = 0.62; $P = .54$; M = $3536, $3225, and $3430 for the excessive, inadequate, and adequate groups, respectively).

Predictors of prenatal care utilization

Results of the multinomial regression showed that a history of a sexually transmitted disease (STD), marijuana use, parity, race, social support in the second and third trimester, self-esteem in the second trimester, symptom distress, readiness for care giving, prenatal care knowledge, and prenatal care satisfaction all had a bivariate relationship with prenatal care utilization of $P < .20$ and were therefore included in the multivariate analysis.

The multivariate analyses showed that nulliparous women were less likely to be inadequate prenatal care users, and women with a history of marijuana use, low symptom distress, and low prenatal care knowledge were more likely to be inadequate users, compared with adequate users. In addition, women with high self-esteem and low readiness for care giving (ie, did not feel prepared for caring for a child) were more likely to be excessive users than adequate users (Table 2).

Predictors of additional health care utilization

Women made an average of 5.3 additional encounters during pregnancy (SD 4.2; range, 0−26); only 14% made none or 1, 50% made 2−5, and 36% made 6 or more. Almost 75% of participants made an unscheduled obstetric visit, with 38% making 2 or more additional visits (Figure 1). An examination of ICD-9 codes revealed that the predominance of the unscheduled obstetric visits were secondary to obstetric complications (56%), with an additional 17% secondary to concerns about sexually transmitted infections. Almost two thirds of the obstetric complications were unspecified, with threatened preterm labor, fetal abnormality, and poor fetal growth being the most commonly coded. Only 10% of these visits were secondary to other medical or surgical issues. Sixty-six percent of participants went to LD at least once when they

were not admitted, and 38% went 2 or more times. Forty-nine percent of participants visited the ED at least once during their pregnancy, with 23% visiting 2 or more times.

Results showed a significant difference in number of additional unscheduled visits by adequacy of care groups (F = 6.86; $P < .001$). Figure 2 the nature of these differences, with the excessive prenatal care group having the most additional visits and the adequate prenatal care group having the least.

Factors associated with health care utilization

Results of the multiple and logistic regressions are presented in Table 3. All variables that had a bivariate relationship of $P < .20$ with at least 1 outcome were included in the table. Results showed that individuals with high symptom distress, excessive prenatal care users, and inadequate prenatal care users had more total number of additional visits during pregnancy. In addition, women who had depressive symptoms and who did not smoke during pregnancy were more likely to have utilized unscheduled obstetrics-gynecology visits. Women with high-symptom distress, overweight/obese women, younger women, and excessive prenatal care users were more likely to utilize the labor floor before delivery. Women with high-symptom distress and inadequate prenatal care users were more likely to utilize the emergency room. Finally, excessive prenatal care users were more likely to utilize MFM services.

Comment

Our study demonstrates that nearly one-third of prenatal care patients receive "adequate plus" or "excessive" scheduled prenatal care visits. This confirms the observations of Kotelchuck, who applied his index to the 1980 National Natality Survey and demonstrated that 22.2% received intensive adequate plus care.[7] Analysis of birth statistics 1981−1995 revealed a major increase in prenatal care utilization, which was mostly accounted for by an increase in excessive utilization from 18.4% in 1981 to 28.8% in 1995.[22] Factors associated nationwide with increased utilization of care were multiple gestations, primiparity, married status, and maternal age 35 years or older.

The results presented here are the first describing unscheduled care in an obstetric population. Despite 81% of the patients in our study having at least adequate scheduled care demonstrated by KI, unscheduled visits were common in pregnancy, with almost 75% of participants having at least 1 unscheduled obstetric visit, half visiting the ED, and two-thirds visiting LD before birth at least once.

Studies derived from EDs have documented that specific populations and demographic groups characterize excessive utilization or "frequent flyers."[8,9] Certain psychological characteristics emerged in this population as predictors of excessive utilization including depression and high-symptom distress, which may be amenable to screening and intervention. Of note, overweight and obese women were more likely to utilize LD for services before delivery. Because 60% of American women of child-bearing age are either overweight or obese, this secular trend may ultimately require a significant change in staffing of obstetrical units. Overweight and obese women may benefit from specific interventions that address somatic complains such as low back and pelvic pain that are exacerbated by both obesity and pregnancy.[23,24]

The population studied represents a predominantly young, nulliparous cohort without chronic medical conditions and can be generalized to many urban clinic settings. Even within this healthy population, there is a group that demonstrates extremely high utilization of care. We did not review the visits to determine which were medically necessary, but did not include any visits that ended with an admission. As expected, more frequent visits translate directly into significant increases in total antenatal costs in the excessive care group (M = $5439), compared

with the inadequate and adequate groups (both M = $3655; F = 16.59; P < .001). This has significant implications to clinics and health care systems receiving reimbursement as a global fee.

This study is limited by a sample that represents a relatively restricted group of young, ethnic minority women of low socioeconomic status who registered for prenatal care before the second trimester and agreed to participate in a randomized clinical trial. They may therefore represent a group of health care seekers. They do, however, represent more than half of the obstetric clinic population seen in our institution. Despite this limitation, the study demonstrates a dichotomy in utilization of care that is significant. Women with adequate care measured by the KI have the least usage of emergency unscheduled care. Inadequate and excessive care users have the most. One can postulate that the inadequate care group is substituting unscheduled visits for routine ones and that the excessive care group is seeking reassurance for their high-symptom distress within the health care system. Addressing these problems during scheduled visits may reduce the overall cost of obstetric care.

Acknowledgements

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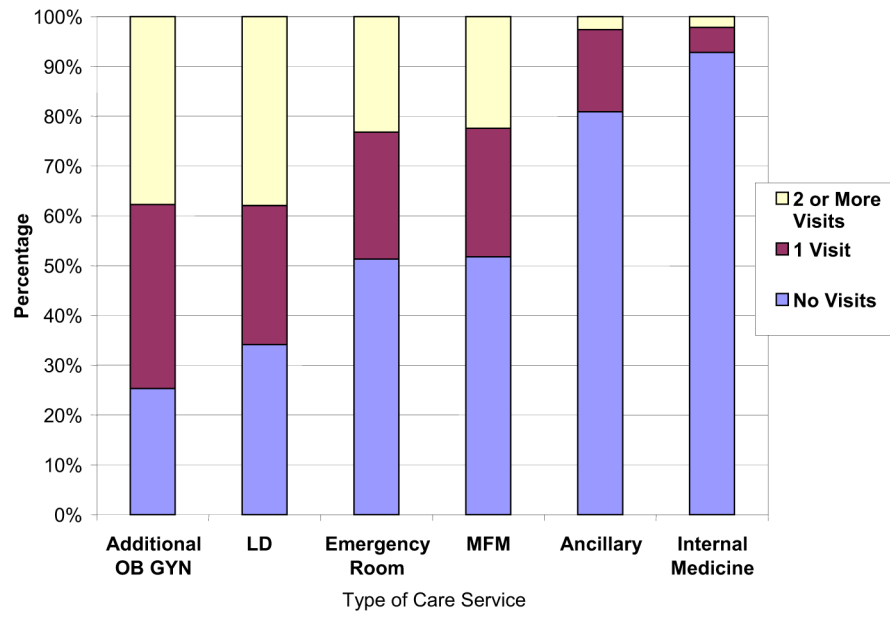
FIGURE 1.
Health care utilization during pregnancy
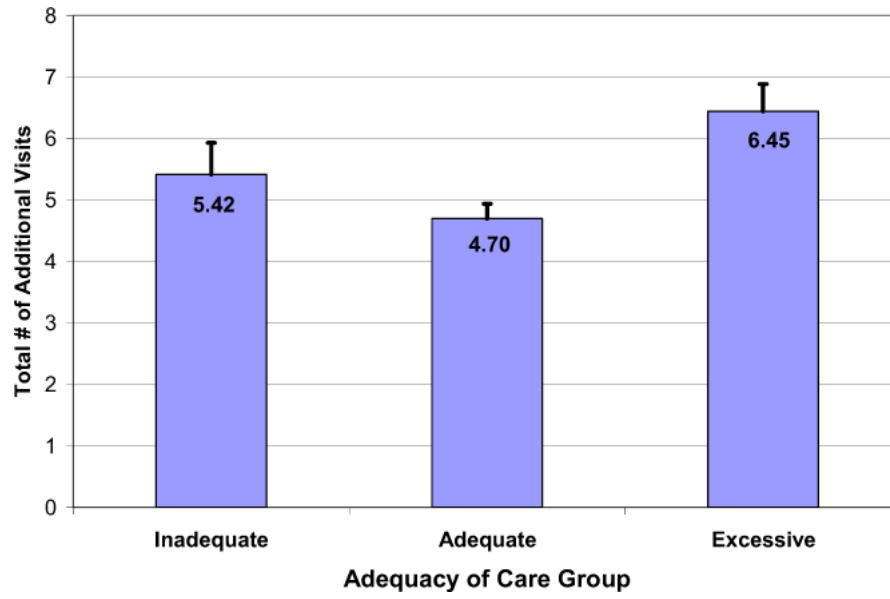
FIGURE 2.
Total number of additional visits by adequacy of prenatal care

TABLE 1

Kotelchuck index groups

	n	%
Inadequate (0−49%)	10	2.4
Intermediate (50−79%)	70	16.7
Adequate (80−109%)	212	50.5
Adequate plus (110−139%)	94	22.4
Excessive/frequent flyer (140−300%)	34	8.1

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TABLE 2

Multinomial regression analysis predicting inadequate and excessive prenatal care vs adequate prenatal care

Predictors	Inadequate vs adequate	Excessive vs adequate
Intervention group	0.93 (0.51−1.69)	1.35 (0.81−2.27)
History of STD (T1)		
Yes	0.76 (0.41−1.39)	0.66 (0.40−1.10)
No	Referent	Referent
Smoked marijuana past year (T1)		
Yes	2.04 (1.04−4.00)[a]	1.69 (0.96−2.94)
No	Referent	Referent
Parity		
0	0.32 (0.14−0.76)[b]	1.02 (0.44−2.37)
1	0.55 (0.22−1.40)	1.31 (0.52−3.27)
2 or more	Referent	Referent
Race		
African American	1.78 (0.94−3.37)	0.98 (0.62−1.56)
White/Latina/other	Referent	Referent
Social support (T1)		
Low	0.59 (0.30−1.23)	1.24 (0.67−2.33)
High	Referent	Referent
Social support (T2)		
Low	2.00 (0.96−4.17)	1.03 (0.55−1.93)
High	Referent	Referent
Self-esteem (T1)		
Low	Referent	Referent
High	1.18 (0.61−2.33)	2.38 (1.33−4.16)[a]
Symptom distress (T2)		
Low	Referent	Referent
High	0.52 (0.27−0.99)[a]	1.20 (0.73−2.00)
Readiness for caregiving (T2)		
Low	0.88 (0.45−1.73)	1.76 (1.04−2.99)[a]
High	Referent	Referent
Prenatal care knowledge (T2)		
Low	3.20 (1.71−5.68)[b]	1.12 (0.68−1.83)
High	Referent	Referent
Prenatal care satisfaction (T2)		
Low	1.67 (0.90−3.10)	1.32 (0.78−2.21)
High	Referent	Referent

T1, second trimester; *T2*, third trimester.

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[a] $P < .05$.

[b] $P < .01$.

TABLE 3

Multiple and logistic regression analyses predicting additional visits

Predictors	Total number additional visits	Unscheduled ob-gyn visits	LD	ED	MFM
Symptom distress group					
Low	Referent	Referent	Referent	Referent	Referent
High	0.19^a	1.18 (0.72–1.93)	$2.75 (1.67–4.55)^a$	$1.49 (0.99–2.27)^b$	1.24 (0.81–1.91)
BMI group					
Overweight/obese	0.07	1.24 (0.80–1.92)	$1.73 (1.15–2.63)^c$	1.05 (0.70–1.50)	1.13 (0.77–1.66)
Normal	Referent	Referent	Referent	Referent	Referent
Age group, y					
14–19	0.03	0.99 (0.64–1.55)	$1.43 (0.94–2.17)^b$	1.03 (0.70–1.50)	1.03 (0.67–1.51)
20–25	Referent	Referent	Referent	Referent	Referent
Depression (T2)					
Depressed	−0.02	$1.60 (0.96–2.69)^b$	1.23 (0.76–1.98)	1.21 (0.80–1.84)	0.69 (0.45–1.27)
Not depressed	Referent	Referent	Referent	Referent	Referent
Smoking during pregnancy	−0.05	$0.61 (0.38–0.98)^c$	1.26 (0.89–2.02)	0.81 (0.53–1.24)	1.24 (0.80–1.92)
Kotelchuck index					
Excessive users	0.21^a	0.99 (0.61–1.63)	$2.00 (1.24–3.61)^a$	1.33 (0.88–2.01)	$2.17 (1.42–3.33)^a$
Inadequate users	0.10^c	0.73 (0.41–1.32)	$1.46 (0.81–2.58)^c$	$1.70 (1.00–2.87)^c$	0.69 (0.40–1.18)
Adequate users	Referent	Referent	Referent	Referent	Referent

Data presented as odds ratio (95% confidence interval).

ED, emergency department; LD, labor and delivery; MFM, maternal-fetal medicine; T1, second trimester; T2, third trimester.

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[a] P < .01.

[b] P < .10.

[c] P < .05.